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WARE FRESSOLA VAN DER SLUYS &
ADOLPHSON, LLP
BRADFORD GREEN, BUILDING 5
755 MAIN STREET, P O BOX 224
MONROE, CT 06468

EXAMINER	
FINDLEY, CHRISTOPHER G	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/797,635	RIDGE ET AL.	
	Examiner	Art Unit	
	Christopher Findley	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 9/12/2005.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. **Claims 23-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

Independent claim 23 recites "A software product for use in motion estimation in coding video data..." that fails to meet the statutory requirement set forth in the Interim Guidelines, Annex IV (a) and (b):

(a) Functional Descriptive Material: "Data Structures" Representing Descriptive Material Per Se or Computer Programs Representing Computer Listings Per Se

Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer.

The program has to be embodied in a *computer readable* medium. Claim 23 fails to recite this aspect.

(b) Nonfunctional Descriptive Material

Nonfunctional descriptive material that does not constitute a statutory process, machine, manufacture or composition of matter and should be rejected under 35

U.S.C. § 101. Certain types of descriptive material, such as music, literature, art, photographs and mere arrangements or compilations of facts or data, without any functional interrelationship is not a process, machine, manufacture or composition of matter.

Claim 23 should be rewritten as a computer readable medium stored thereon a computer program containing steps for executing the operations described in claim 19.

Claims 24-30 are dependent upon claim 23.

Appropriate corrections are required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1-7, 10-13, 15-16, and 18-30 are rejected under 35 U.S.C. 102(a) as being anticipated by Koto et al. (US 20030215014).

Re claim 1, Koto discloses a method for motion estimation in coding video data indicative of a video sequence including a plurality of video frames, each frame containing a plurality of coefficients at different locations of the frame, said method comprising: selecting at least one reference frame for a given original video frame (Koto: Abstract section); partitioning said original video frame into rectangular blocks of coefficients (Koto: Abstract section); forming at least one reference block of coefficients

from an offset of the rectangular blocks (Koto: Fig. 12, the motion vectors indicate displacement); computing the differences between said at least one reference block and the rectangular blocks (Koto: Fig. 33); and optimizing the offset (Koto: paragraph [0146]).

Re claim 2, Koto discloses obtaining M video frames for providing M references frames, wherein M is a positive integer greater than or equal to one (Koto: Fig. 11).

Re claim 3, Koto discloses that for each of said rectangular blocks of coefficients and each permutation of a horizontal offset value X and a vertical offset value Y, obtaining M additional rectangular blocks of coefficients for providing M reference blocks, wherein each of said M reference blocks of coefficients is formed by selecting coefficients from the M reference frames, such that the coefficients in the M reference blocks of coefficients are horizontally offset by distance X and vertically offset by distance Y from a corresponding coefficient in said rectangular block of coefficients (Koto: paragraph [0146], candidate motion vectors are scaled according to inter-frame distance, leaving only a 2-dimensional (x, y) offset).

Re claim 4, Koto discloses for each of said M reference blocks, obtaining the difference between said rectangular block and each said reference block of coefficients for providing a block difference at least partially involving summation of the differences between corresponding individual coefficients in each block (Koto: paragraph [0012]).

Re claim 5, Koto discloses for each of said rectangular blocks of coefficients, determining an optimal horizontal offset X and vertical offset Y, wherein said

determining is based at least partially on minimizing a weighted sum of M block differences (Koto: paragraph [0013]).

Re claim 6, Koto discloses that each of the M video frames selected as the M reference frames is computed based on the same frame of original video (Koto: Fig. 12).

Re claim 7, Koto discloses that the block differences for the M reference blocks are combined for providing a weighted sum having a plurality of weighting factors, and wherein each weighting factor in the weighted sum is determined at least partially based upon a quantizer parameter or the index of the reference frame subjected to that weight (Koto: paragraphs [0081]-[0084]).

Re claim 10, Koto discloses that the set of M reference frames is divided into N sub-sets, such that each of the M reference frames belongs to precisely one of the N sub-sets, and wherein the process of determining the optimal horizontal offset X and vertical offset Y is repeated for each of said N sub-sets of reference frames, for indicating a set of N optimal horizontal offsets X and N vertical offsets Y (Koto: Fig. 11, MPEG may use a linear prediction scheme, allowing a group of pictures (GOP) may be divided into subgroups).

Re claim 11, Koto discloses that said determining of the optimal horizontal offset X and optimal vertical offset Y involves a discrimination against offsets with large magnitudes (Koto: paragraph [0146], the minimum value is sought).

Re claim 12, Koto discloses that the discrimination is at least partially dependent upon an index corresponding to which of the M reference frames is being considered (Koto: paragraph [0146], candidate motion vectors are scaled according to inter-frame distance).

Re claim 13, Koto discloses that the number N may vary from one frame of video to another frame of video (Koto: Fig. 11, the number of reference frames may vary as well as the number and type of frames in a GOP, allowing the number of subsets to vary accordingly).

Re claim 15, Koto discloses that for each rectangular block, the set of M reference blocks is divided into N sub-sets, such that each of the M reference blocks belongs to precisely one of the N sub-sets, and wherein the process of determining the optimal horizontal offset X and vertical offset Y is repeated for each of said N sub-sets of reference blocks, for indicating a set of N optimal horizontal offsets X and N vertical offsets Y (Koto: Fig. 11, MPEG may use a linear prediction scheme, allowing a group of pictures (GOP) may be divided into subgroups, and, in turn, dividing the number of reference blocks as well).

Re claim 16, Koto discloses that the number N of sub-sets may vary from one block to another within the given frame of video, said variation either based upon explicit signaling in the encoded bit stream or upon a deterministic algorithm (Koto: Fig. 11, the number of reference frames (explicitly indicated by the Code_number) may vary as well

as the number and type of frames in a GOP, allowing the number of subsets to vary accordingly).

Re claim 18, Koto discloses a coding device for coding video data indicative of a video sequence including a plurality of video frames, each frame containing a plurality of coefficients at different locations of the frame, said device comprising: a motion estimation module, responsive to an input signal indicative of an original frame in the video sequence, for providing a set of predictions so as to allow a prediction module to form a predicted image (Koto: Fig. 1, element 119); and a combining module, responsive to the input signal and the predicted image, for providing residuals for encoding (Koto: Fig. 1, element 110), wherein the motion estimation block comprises a mechanism for carrying out the steps of: selecting at least one reference frame for a given original video frame (Koto: Fig. 1, element 120); partitioning said original video frame into rectangular blocks of coefficients (Koto: Fig. 12, the frames are partitioned into blocks); forming at least one reference block of coefficients from an offset of the rectangular blocks (Koto: Fig. 12, motion vectors indicate offsets); computing the differences between said at least one reference block and the rectangular blocks (Koto: Fig. 33); and optimizing the offset (Koto: paragraph [0146]).

Claim 19 has been analyzed and rejected with respect to claim 2 above.

Claim 20 has been analyzed and rejected with respect to claim 3 above.

Claim 21 has been analyzed and rejected with respect to claim 4 above.

Claim 22 has been analyzed and rejected with respect to claim 5 above.

Claim 23 recites the corresponding computer program for implementing the method of claim 1, and, therefore, has been analyzed and rejected with respect to claim 1 above.

Claim 24 has been analyzed and rejected with respect to claim 2 above.

Claim 25 has been analyzed and rejected with respect to claim 3 above.

Claim 26 has been analyzed and rejected with respect to claim 4 above.

Claim 27 has been analyzed and rejected with respect to claim 5 above.

Claim 28 has been analyzed and rejected with respect to claim 7 above.

Claim 29 has been analyzed and rejected with respect to claim 10 above.

Claim 30 has been analyzed and rejected with respect to claim 15 above.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koto et al. (US 20030215014).

Re claim 14, Koto discloses a majority of the features of claim 14 as discussed in claims 1-5 and 11 above, but does not explicitly disclose that the number N may vary from one frame of video to another frame of video, and the determination of the number N involves analysis of block differences in the previous frame. However, the Examiner takes Official Notice that one of ordinary skill in the art at the time of the invention would have found it obvious that a scene change may truncate a GOP, as is well known for instance to implement frame dropping rate control, therefore causing the GOP to contain less reference frames than is typical.

Re claim 17, Koto discloses a majority of the features of claim 17 as discussed in claims 1-3 and 15-16 above, but does not explicitly disclose that the size of a rectangular block in one of the N sub-sets is computed at least partially using the size of a rectangular block in another of the N sub-sets or the values of the horizontal offsets X and vertical offsets Y. However, the Examiner takes Official Notice that one of ordinary skill in the art at the time of the invention would have found it obvious that a search block in a reference frame typically occupies an area that is a multiple of the size of the target block, as is well known.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koto et al. (US 20030215014) in view of Wu et al. (US 6700933 B1).

Re claim 8, Koto discloses a majority of the features of claim 8 as discussed in claims 1 and 2 above, but does not explicitly disclose that each of the M video frames selected as the M reference frames is computed by decoding the same frame of original video at a variety of quality settings. However, Wu discloses a method with advance predicted bit-plane coding for progressive fine-granularity scalable (PFGS) video coding, where different layers are used for different quality of video (Wu: Fig. 23). Since Koto and Wu both employ motion estimation/compensation (Koto: Abstract section; Wu: Fig. 19, elements 204, 206, and 207), one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a robust coding scheme which adapts to bandwidth fluctuation and also exhibits good error recovery characteristics (Wu: column 3, lines 27-29). The combined method of Koto and Wu has all of the features of claim 8.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koto et al. (US 20030215014) in view of Kato et al. (US 6151360).

Re claim 9, Koto discloses a majority of the features of claim 9 as discussed in claims 1-5 above, but does not explicitly disclose that motion is represented by a motion vector to be encoded in bits, and wherein said determining is also based on the number of bits needed to encode the motion vector. However, Kato discloses a method for encoding a video signal using statistical information, where motion vector complexity and available bitrate are used as factors in the coding process (Kato: Fig. 8; column 8, line 22, through column 9, line 13). Since both Koto and Kato relate to coding with

motion information, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to viewing is enhanced by rendering image noise less obtrusive (Kato: column 1, line 64, through column 2, line3). The combined method of Koto and Kato has all of the features of claim 9.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. Multiple frame motion estimation

Lavagetto et al. (US 5151784 A)

b. Multi-hypothesis motion-compensated video image predictor

Wiegand et al. (US 6807231 B1)

c. Method and apparatus for weighted prediction estimation using a displaced frame differential

Yin et al. (US 20060198440 A1)

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Findley whose telephone number is (571) 270-1199. The examiner can normally be reached on Monday-Friday 7:30am-5pm, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher Findley/